III. *Rules for Refolving two Cafes in Oblique Spherical Trigonometry, by* WILLIAM CROSWELL, A. M. *Teacher of Navigation.*

GIVEN two fides of an oblique angled fpherical triangle and the included angle, required the third fide.

RULE.

Add together the cofecant of half the included angle, the half cofecants of the including fides, and the fine of half the difference of the fides; the fum will be the tangent of an angle, the cofecant of which being added to the fine of half the difference of the fides, the fum will be the fine of half the required fide.

Example. Let the including fides be, one 82° 16′, and the other 62° 40′, and the including angle 127° 08′, and let it be required to find the other fide.

2) 127 08 — Half difference of including fides 9° 48′

63 34 Cofecant.	0 04798			
62 40 Half Cofe.	0 02571			
82 16 Half Cofe.	0 00199			
9 48 Sine.	9 23098			9 23098
11° 27′ &c. Tangent.	9 30666	Corref. Cofe.		0 70209
		59° 00	Sine.	9 93307
		2		
		118 00 Side required.		

By this rule, mutatis mutandis, when two angles, and the included fide are given, the third angle may be found:—and by reverfing this rule, when three fides are given, an angle may be found.

GIVEN the apparent diſtance of the moon from the ſun, or a fixed ſtar; and alſo the apparent and true altitudes of the objects; required their true diſtance.

RULE.

To the apparent diſtance, add the difference of the apparent altitudes, and take half the ſum: alſo, from the apparent diſtance, ſubſtract the difference of the apparent altitudes, and take half the remainder; then add together the half coſecants of the half ſum, and half remainder, the reſerved logarithm, and the ſine of half the difference of the true altitudes; the ſum will be the tangent of an angle, the correſponding coſecant of which being added to the ſine of half the difference of the true altitudes, the ſum will be the ſine of half the true diſtance.

Example. Moon's apparent altitude 12° 30′. True altitude 13° 20′ 42″. Star's apparent altitude 24° 48′. True altitude 24° 45′ 57.″ Apparent diſtance 51° 28′ 35″. Required the true diſtance.

24° 48′
12 30
12 18 Difference of apparent altitudes.

24° 45′ 57″
13 20 42
2) 11 25 15
5 42 38 Half difference of true altitudes.

51° 28′ 35″	Apparent diſtance	51° 28′ 35″	
12 18 00	Differ. of appar. altitudes	12 18 00	
2) 63 46 35		2) 39 10 35	
31 53 18	Half ſum.	19 35 17	Half rem.

Reſerved

Referved log.			68	
Half fum.	31° 53′ 18″	Half cofe.	0 13857	
Half rem.	19 35 17	Half cofe.	0 23731	
Ha. diff. of t. al.	5 42 38	Sine.	8 99783	8 99783
	13° 19′ &c.	Tangent.	9 37439	Cofe. 0 63745
			25° 34′ 56″	Sin. 9 63528
			2	
			51 9 52	True diftance.

Inftead of finding the feconds in the arc anfwering to the above tangent, the correfponding cofecant is found at once by the following proportion: as the difference between the next greater, and next lefs tangents, to the difference between the correfponding cofecants, fo is the difference between the given tangent, and the next greater, to a fourth number, which muft be added to the leaft of the correfponding cofecants.

IV. *Obfervations of an Annular Eclipfe of the Sun, at Cambridge, April 3d, 1791, by* SAMUEL WEBBER, A. M. *Hollis Profeffor of Mathematicks and Philofophy in the Univerfity at Cambridge.*

EXPECTING an annular eclipfe of the fun, on the third of April, I previoufly took correfponding altitudes of the fun with a tranfit inftrument, in order to afcertain, with all the precifion in my power, the going of the clock, which belongs to the Univerfity. But, the day before the eclipfe happened, the clock unfortunately ftopped, for want of fome repairs,